Circular No. 733

August 1945 • Washington, D. C.

UNITED STATES DEPARTMENT OF AGRICULTURE

Standard-Density Cotton-Gin Presses

By Charles A. Bennett, *senior mechanical engineer*, and J. E. Harmond, *mechanical engineer, Division of Farm Mechanical Processing, Bureau of Plant Industry, Soils and Agricultural Engineering, Agricultural Research Administration*, and Charles S. Shaw, *associate cotton technologist, Cotton and Fiber Branch, Office of Marketing Services*

CONTENTS

PRESSING cotton to standard density (22 to 25 pounds per cubic foot) at gins is mechanically and economically feasible. This fact has been definitely demonstrated by experimental and investigational work recently completed. The investigations have shown that substantial savings can be attained by gin standard-density pressing and subsequent recompression as now practiced in the United States.[1] Other advantages of gin compression as compared with customary methods of packaging and compressing have been found to include improved appearance of cotton bales, elimination of press cuts, and increased protection against damage, deterioration, and loss of cotton, as well as greater ease in handling the bales in shipment and in mill opening and picking processes (fig. 1).

Higher density compression at the cotton gin is by no means new, as is evidenced in the successful production of 250-pound round bales in the United States and 400- to 500-pound square bales in South America, where many gin manufacturers of this country have sold special presses. The farm and trade practices in the United States, however, have become established around 500-pound square bales, the

[1] Wright, J. W., Gerdes, F. L., and Bennett, C. A. The packaging of American cotton and methods for improvement. U. S. Dept. Agr. Cir. 736, 64 pp., illus. 1945. This publication provides a broad coverage of the subject of packaging cotton, including the economic aspects as well as the effect of the various methods on spinning quality.

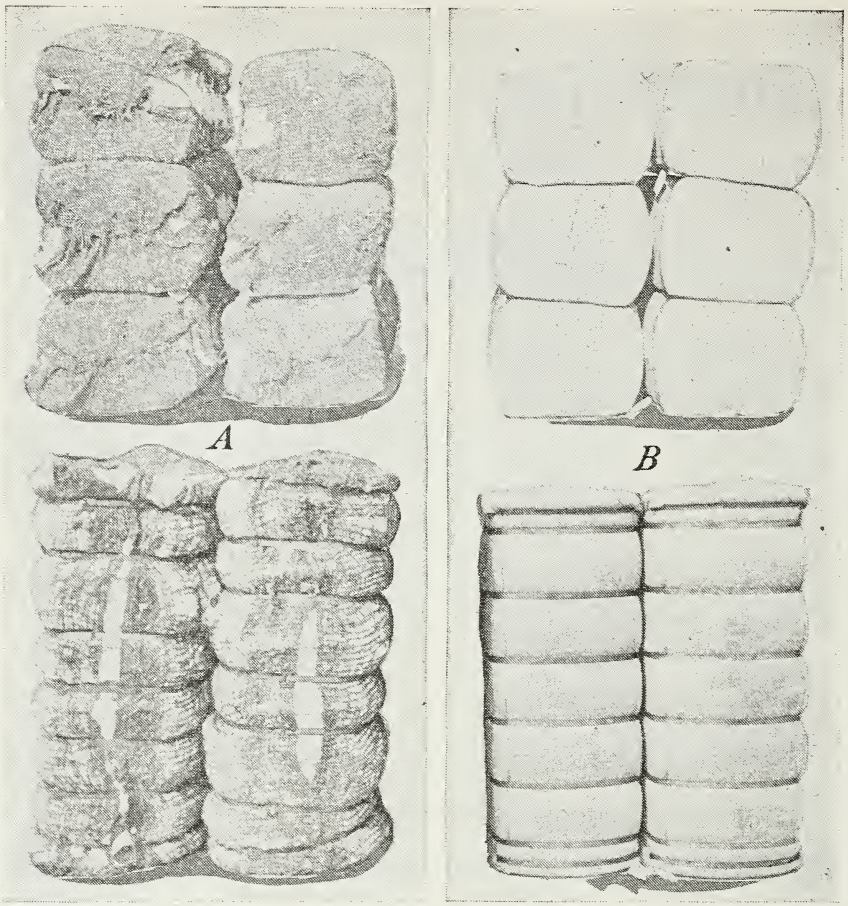

FIGURE 1.—End and side appearance of standard-density cotton bales: *A*, Compress bales; *B*, gin bales.

production of which involves many thousands of press boxes, which are uniformly 54 inches long, with condensers and trampers to match. Hence this publication is concerned with (1) the engineering problems involved in producing higher density bales at cotton gins without a broad departure from existing conditions and equipment or great expense for new machinery and (2) the mechanical elements of cotton-gin press construction to meet bale packaging requirements for standard-density domestic shipment and consumption and to permit satisfactory recompression of bales to high density for export.

Although the information here reported was developed through tests made on uppressing presses, which represented 11,522, or 88 percent, of the gin presses in the United States in 1940,[2] the findings should be applicable to downpressing presses, which were used in 1,567, or 12 percent, of the cotton gins in this country.

[2] U. S. BUREAU OF THE CENSUS. COTTON GINNING MACHINERY AND EQUIPMENT IN THE UNITED STATES, 1940. 43 pp., illus. 1941. [Processed.]

STANDARD-DENSITY GIN-PRESS FEATURES

General Requirements and Specifications

Laboratory as well as field investigations both in the rain-grown cotton and arid cotton regions of the Cotton Belt have proved that standard densities of 22 to 25 pounds per cubic foot could best be obtained with triple 9½-inch diameter rams in conjunction with 20-inch-width press boxes. An increase of approximately 20 inches in length is necessary for these rams over the conventional shorter rams of low-density gin bale presses, but no essential changes are required in box depth.

As compared with low-density gin presses, standard-density presses have the following features: (1) Triple rams of longer stroke and larger diameter; (2) stronger press frames, columns, sills, platens, outboard strain rods and members, boxes, and door locks; (3) larger hydraulic piping, valves, oil reservoir, and casing inlets; (4) stronger tramper supports and narrower tramper; (5) narrower and sturdier follower blocks; (6) more tie grooves; and (7) minor

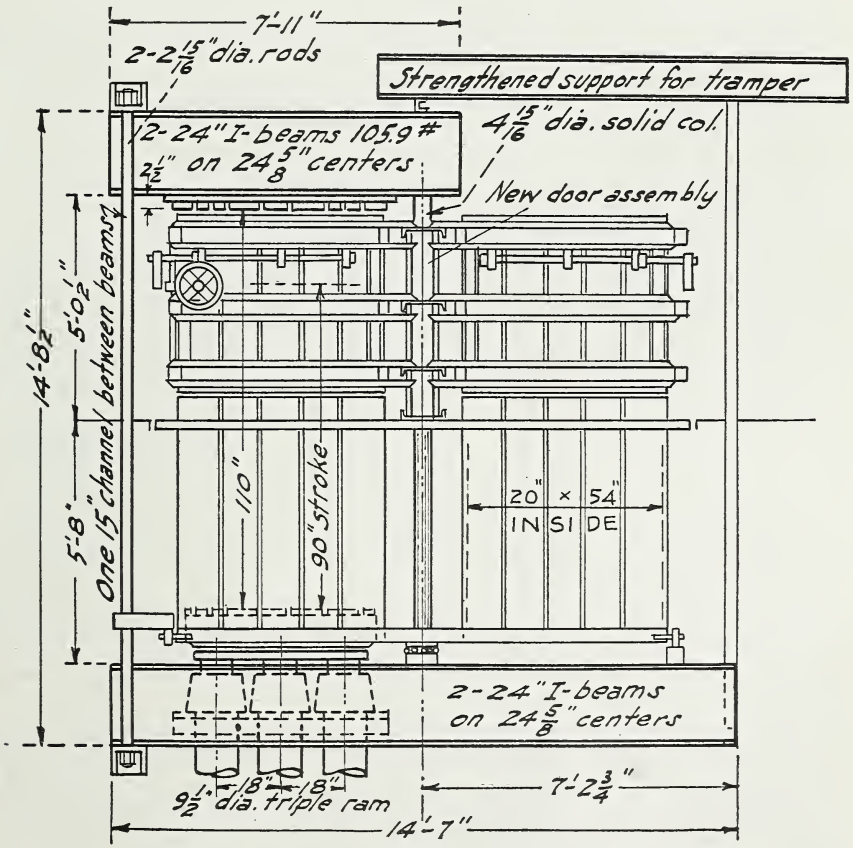

FIGURE 2.—Principal features and suggested dimensions desirable in a standard-density uppressing gin press.

adjustments to existing condenser, kicker, and pump (fig. 2). It is important that the general dimensions of any standard-density gin press be such as to permit it to replace an older low-density unit.

Brief specifications for factory-built standard-density gin presses and installations are as follows:

Foundations at the gin should be of concrete, with suitable pit for three rams. A pit 9 feet 6 inches deep, 18 inches wide, and 48 inches long has been satisfactory, but tile or tubular sumps for individual rams may be used. Foundations should allow ample clearance spaces for column nuts and sill saddles.

Rams and their casings should be suitable for working pressures of 2,600 pounds per square inch. Three rams are required and should be 9½ inches in diameter by 10 feet 6 inches long for an approximate stroke of 90 inches. Heads of the casings should be tapped for 1¼-inch or larger pipe thread, and casings should be of steel tubing or cast steel.

Framing of the press should be capable of withstanding a load of 276 tons applied over a 54-inch center distance on the 84- to 90-inch beam span. Framing joints and connections may be riveted, welded, or bolted, but full safety strength of the joint must be assured. All bolts should be not less than 1 inch in diameter at main joints and fitted to reamed holes.

Platen beams and bottom sills may be either of hot-rolled steel slabs or of structural framing, equal in strength to two cross-braced 24-inch I-beams weighing 105 pounds per foot. Bottom sills should be full press-frame length to connect with tramper outboard supports.

Center column should be not less than 4½ inches in diameter at the root of the threads, and be SAE No. 1045 or equal strength steel; and center column saddle should be 4- by 10-inch overhung solid slab or built-up structural steel. Two removable lock-ring collars, cut in halves, should be used on the center column to support it on the bottom sills and to support the platen beams.

Outboard members, strain rods, and saddles should be widespread against upset and be framed into other members for maximum strength. Strain rods should be not less than 3 inches in diameter and be SAE No. 1045 or equal strength steel, with a 2- by 8-inch overhung solid slab or built-up structural-steel saddle. Outboard members of press frame and tramper support should be structural channel or I-beam with ample connections.

Cotton and press boxes should be of all-steel construction with horizontal cross sections 54 inches long by 20 inches wide. The net effective depth of the boxes should if possible be 10 feet. For safety considerations the doors should be of side-swing type, with heavy hinges, amply braced, and, having 4 dogs per door, located out of line with the tie channels. Press boxes should have outward taper, at the top of sides, of from ½ to ¾ inch per door. Turntable and box assembly should be trunioned on ball or roller bearings with hardened steel races.

Platen and follower should be built up from bar or structural steel, with channel slots for 11 ties, spaced to permit sampling, and suitable for 8 flat or 11 wire ties. Channel slot assemblies should be removable for alterations or repairs. Follower should be designed to avoid tearing bagging at ram heads.

Tramper should be of heavy-duty type, or strengthened for more severe loads than found in low-density pressing. Tramper sill should be of sufficient depth to prevent deflection or warping under load and strongly framed to bottom sills through the outboard member.

Pump should be capable of delivering 12 to 20 gallons of fluid per minute against pressures up to 2,600 pounds per square inch (p. s. i.) and with belt of 20 horsepower or more or motor power available for peak load.

Piping should be 1¼-inch extra heavy, with valves, check valves, and forged fittings suitable for pressures up to 2,600 p. s. i.

With narrowed cotton boxes of 20- by 54-inch cross section and with triple 9½-inch rams, the total loads applied to produce standard-density bales range from 160 to 276 tons at hydraulic working pressures of 1,500 to 2,600 pounds gage pressure, as compared with 345 to 447 tons and hydraulic working pressures of 3,240 to 4,200 p. s. i. required for producing standard-density bales in conventional 27- by 54-inch boxes.

Bagging strips 50 by 90 inches in size provide complete coverage for gin standard-density bales. Close-woven coverings are desirable, because they offer better protection to the bale contents, permit security in sewing the bagging ends, and make a neat package.

Eight ties for rain-grown cottons, each 114 inches long and 15/16 inch wide, 19-gage hot-rolled steel made from the regular 45-steel tie material, are recommended for use in tying the 20- by 54-inch standard-density gin bale. Folding them for double thickness at the ends, however, is necessary to prevent slippage and shearing at the opening of the arrow buckles. The 114-inch length ties in combination with 50- by 90-inch strips of 2-pound jute bagging permit adherence to customary tare weights not exceeding 21 pounds, and tare would be proportionately less with lighter covering material. Instead of the 8 flat ties, 11 wire ties can be used.

Press Boxes

Standard-density gin presses should retain the conventional 54-inch inside length of their boxes, but the inside width of 20 inches was fully proved to be optimum for gaining all the advantages attendant upon the use of existing press pumps and their satisfactory limits of pressure. Full 10-foot depth of press and cotton boxes should be retained; and to relieve friction and door strains during pressing, the side doors should each be given an outward taper at the top of about ½ inch, making the cross section 21 by 54 inches at the top.

Tramper and Condenser

A narrow press box involves a narrow follower on the tramper, approximately 18 by 52 inches, and modified cut-off gate and lint slide at the terminus of the condenser, so that the mechanism may operate effectively within these limits. The condenser used in connection with a gin standard-density press is of the same design and is operated in the same manner as the condenser for a low-density press. If a new tramper is to be furnished with a factory-built standard-density press, it should be of heavy-duty type to facilitate denser packing with ease because the tramper load is heavier than for low-density work.

Press Frame

The beams, columns, strain rods, door mechanism, and platens must all be sturdier for standard- than for low-density pressing. The top platen beams and bottom press sills should successfully withstand loads increased from 69 to as much as 276 tons. Columns and strain rods or outboard members are likewise subjected to the increased stresses and strains.

The beams may be either of structural-steel shapes or hot-rolled steel slabs. For satisfactory service, press sills and platen beams should be equal in strength to double 24-inch I-beams weighing 90 to 105 pounds per linear foot.

Single outboard and center columns should not be less than 4½ inches net diameter, with saddles and collars to match, all of which should be properly integrated into the framing of the beams, which are separated with sturdy spacers or cross braces. It is recommended

that the outboard column be constructed of two strain rods and a structural control member, in which the use of two well-spaced 3-inch strain rods and a heavy 15- or 18-inch structural channel should be satisfactory.

The design of the press frame should include suitable rigid mounting for the tramper, and the foundation lay-outs should provide clearance sumps for saddles, column ends, and nuts. Fitted bolts should be used for bolted connections to eliminate looseness and play.

Platen, Follow Blocks, and Retaining Mechanism

Tie channel spacings for the platen and follow block of a gin standard-density press require 8 flat or 11 wire tie channels for standard density, as compared with 6 for low density. A spacing found satisfactory for meeting these requirements is shown in figure 3.

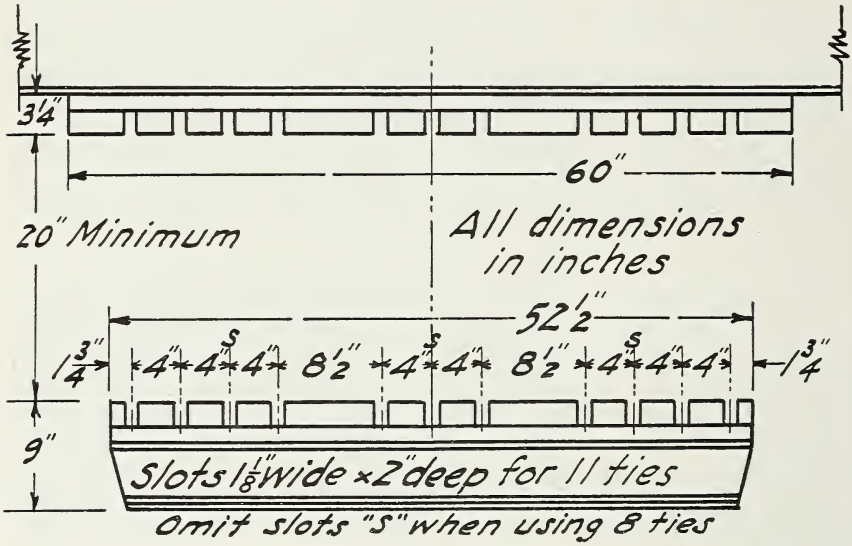

Figure 3.—Tie-channel spacings, platens, and minimum platen separation used for standard-density gin press.

The upper platen or tie-channel construction must be strong enough to resist distortion and may be made with hot-rolled bars welded to a heavy plate, which in turn is bolted to the platen beams to suit the factory methods. It is desirable that the channel assemblies be removable.

The follow block, which rides upon the rams, should be sturdy and heavy. It should be of sufficient depth to prevent seizure of bagging when the rams are down and should have ample clearance at sides and ends to produce a neat bale without the unsightly bulges at the ends that result from too great a clearance.

It is to be noted that the spacing of the tie channels in figure 3 are such that satisfactory samples may be cut from the bale and that the 11-channel spacing may be made to serve for 8 flat ties by not using the center and third-from-end slots.

Rams and Casings

Where three rams 9½ inches in diameter and 10 feet 6 inches in length are used with a normal ram stroke of 90 inches, a 20-inch-width standard-density press of conventional press depth of boxes will operate with hydraulic pressures within the 1,500- to 2,500-pound range per square inch that can be attained with the present gin pumps.

Extra-heavy commercial 10-inch oil-well tubing provides satisfactory casings of ½-inch wall thickness and 9¾-inch inside diameter. An important feature that must be included in the construction of the casing heads is an oil passage into each casing of adequate size to prevent any restriction in the flow of the oil. An ample oil flow into the casings is essential to reduce pumping time; therefore, 1¼-inch pipe tappings are recommended. Conventional safety provisions to prevent blow-out of rams at end of stroke may be used, but these are liable to damage the packing and are not indispensable.

Flat-bale presses are usually provided with rams ranging from 7 feet 11 inches to 8 feet 10 inches in length, because the platen separation is seldom less than 32 inches; but higher density packaging requires rams 20 inches longer for the greater travel associated with closer platen separation, as well as for safe support at the end of the stroke.

To provide for the more extreme conditions of pressing, new presses should be fitted with 9½-inch-diameter factory-built rams having a 90-inch stroke. The presses should be provided with one-piece steel casings of extra-strong 10-inch seamless pipe in lieu of cast iron.

Pumps, Piping, and Power

Present pumps on low-density gin presses are generally suitable for use in standard-density presses with narrow or 20-inch press boxes and with 9½-inch-diameter triple rams. For direct pumping, the pump cylinders must be able to withstand 2,600 p. s. i. hydraulic working pressures for the most severe conditions and should be able to deliver 12 to 20 gallons of water or hydraulic oil per minute to the rams (fig. 4). The A-frames of older style ver-

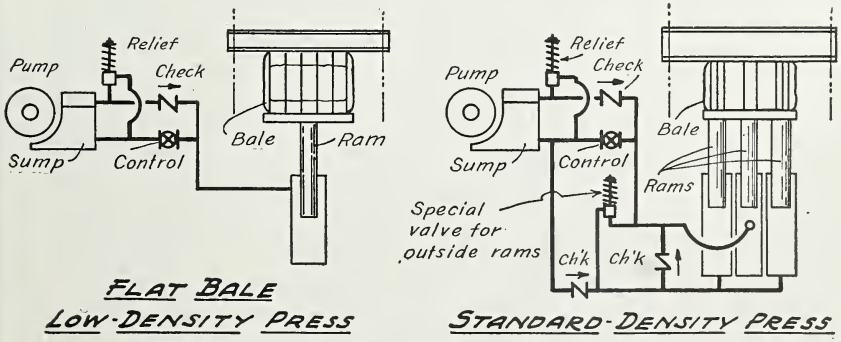

Figure 4.—Hydraulic piping for cotton-gin presses: Left, conventional single-ram press; right, standard-density triple-ram press.

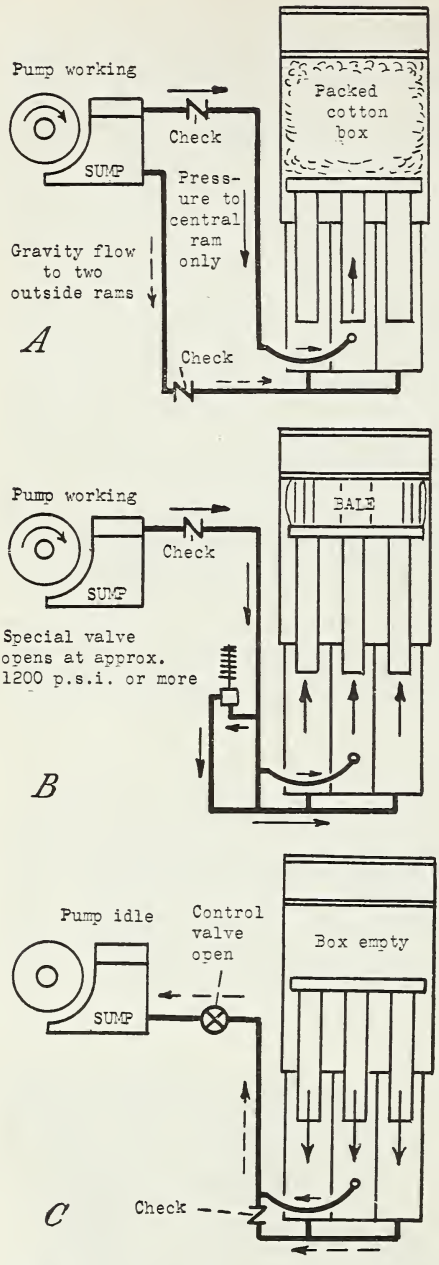

FIGURE 5.—Operation of standard-density gin press, showing parts of piping used for each stage: *A*, First stage, pressure to central ram only; *B*, second stage, all rams under pressure from approximately 1,200 pounds per square inch or more to the necessary maximum; *C*, third stage, pump idle, the fluid returning to reservoir by weight of rams.

tical triplex pumps should be reinforced to insure protection against breakage, but the more recent designs of horizontal and vertical pumps do not require this. The pump speed and the piping arrangements jointly determine the horsepower load and directly influence the time required to complete the full stroke of the rams. It is highly desirable that the piping system should have an ample flow area at least equal to the 1.28 square inches of area provided by 1¼-inch extra-strong steel pipe. All valves and fittings should be of forged steel and suitable for 3,000 pounds per square inch working pressure.

While low-density pressing requires only one stage of hydraulic action, standard-density pressing involves two distinct stages (fig. 5). (1) The central ram is lifted under pressure and drags or lifts the two outside rams with it; as these outboard rams "trail," their cylinders are filled by gravity through a check valve. (2) An automatic cut-over occurs at a predetermined pressure so that all three rams come under the direct pumping action of the pump, which thereafter supplies hydraulic fluid to all cylinders until the end of the ram stroke has been reached.

Since the pumping power needed depends on the time required to complete a pressing cycle, it is somewhat flexible, depending upon the number of gin stands in the ginning outfit. Tests showed that a 15-horsepower unit could satisfactorily serve a 3/80 outfit producing only 3 or 4 bales per hour and that a 20-horsepower unit would handle a 4/80 gin, but a 5/80 outfit required approximately 25 horsepower because of the decreased allowable pumping time permissible for pressing and tying out each bale (table 1).

TABLE 1.—*Power and energy requirements as affected by varying press-box dimensions of standard-density gin presses.*

Press-box dimensions (inches)	Bales observed	Bale weight (gross)	Minimum platen separation	Peak hydraulic pressure[1]	Energy consumed [1]			Peak power load [1]	
					Press pump	Tramper and condenser	Press pump, tramper, and condenser	Press pump motor	Tramper and condenser
	No.	*Lb.*	*In.*	*P.s.i.*[2]	*Kw.-hr.*	*Kw.-hr.*	*Kw.-hr.*	*Hp.*	*Hp.*
20 x 54	55	500	21.0	1,804	0.49	0.60	1.09	21.0	12.3
		550	23.0	1,827	.55	.70	1.25	21.2	16.5
		600	25.0	1,850	.62	.80	1.42	21.5	20.8
23½ x 54	18	500	18.3	2,166	.60	.50	1.10	20.2	5.7
		550	20.1	2,621	.60	.55	1.15	21.5	8.2
		600	21.8	3,097	.61	.59	1.20	22.8	10.6
27 x 54	25	500	15.6	2,891	.53	.54	1.07	20.8	4.8
		550	17.2	3,021	.60	.59	1.19	22.0	6.5
		600	18.7	3,150	.68	.63	1.31	23.2	8.2

[1] These figures are derived through multiple correlation analyses of data from tests on cotton bales varying in moisture content, weight, and density.
[2] Pounds per square inch.

INSTALLING AND OPERATING COSTS

Upon the basis of a press installation, representative costs were obtained in 1942 of an all-steel, low-density, 2-story cotton-gin press frame, boxes, table, ram, piping, and minor items. It is calculated that a factory-built standard-density, all-steel, 2-story, cotton-gin press with convertible narrowed boxes, table, three rams, piping, and tramper alterations to fit should reasonably range from $2,000 to $2,500 higher than the conventional low-density press.

Upon the basis of expenses incurred by the United States Cotton Ginning Laboratory in converting presses already at gins from low to standard density, the costs may be expected to range from $2,500 to $3,500, for reasons previously discussed in detail.

Operating costs for low-density pressing, including power maintenance and repair items, ranged from 2.8 cents per bale with a 4,000-bale volume to 3.4 cents with a 1,000-bale volume. Standard-density pressing at gins increased these costs per bale to 4.7 and 5.7 cents for the respective volumes of ginning.

CONVERTING LOW-DENSITY GIN PRESSES FOR STANDARD-DENSITY SERVICE

The field conversion of low-density gin presses for standard-density pressing is by no means a simple job and is feasible only where extensive shop facilities and skilled mechanics are available to the ginner. Where such conversions are made in lieu of factory-built installations, the previously described requirements and specifications should be followed in detail as closely as possible, without skimping on construction.

Field conversions should take advantage of available heavy-duty parts from linter and export presses that manufacturers may have on hand, such as threaded-center columns and nuts, side-swinging doors, worm-and-wheel heavy door locks, hinge assemblies, and main bearings. The purchase of such parts will do much to avoid difficult

designing in the field and will insure easy replacement from wear or damage.

Shop work on home-made conversions should also eliminate doubtful welding, upon which safety may depend; instead, it should resort to fitted-bolt connections that are adequate in number and size of bolts to develop full strength at all times.

A converted gin press usually retains its original condenser, tramper, cotton boxes below turntable, and the turntable structure, except as hereinafter described. Alteration of the tramper follower block, the condenser lint-slide lip, and the cut-off gate are necessary to permit the introduction of ginned lint into the narrowed press boxes. New sill and platen beams with heavier framing as well as a heavy center column and bearing are required in their entirety for substitution for the original lighter weight structural-frame members of the press.

For safety precautions to prevent serious accidents, the drop doors on the press boxes must be converted to strongly braced, side-swinging doors with stout toggle latches; and the press and cotton boxes must be lined with smoothly finished, waxed oak liners, to reduce the internal width of the press boxes to 20 inches.

The installation necessitates a somewhat wider and longer ram pit below ground level, so that the rams may be installed with block and tackle after the footings are poured and the press sills set into position. Blocking up the turntable and press-box parts then permits the removal of the center column and frame parts to be replaced by heavier ones.

In view of the difficulties met in adapting the condenser slide cut-off gate to the narrower box width of existing low-density presses, a factory-redesigned tramper layout is advisable in making a conversion to presses for higher density.

General Features Involved

The representative low-density gin press used in the United States is of double-box construction, with wooden or steel cotton and press boxes and with steel frames and columns. Single hydraulic rams predominate, with a small percentage of single screws as the means for pressing. In uppressing and downpressing presses, the cotton is tramped down into the receiving boxes by a tramper (fig. 6).

Press Frames and Boxes

Although all American Egyptian and much sea-island cotton ginned on roller gins is packaged in single-box presses, virtually all the saw gin plants in the United States are equipped with double-box outfits the cross-sectional dimensions of which are 27 by 54 inches, with a total net cotton-box depth averaging 112 inches for uppressing and 86 inches or more for downpressing presses, and with provisions for 6 ties to be used in tying out the bales. Top and bottom sills for these presses are usually constructed of trussed timber or structural steel in commercial rolled shapes, and the steel center columns of various cross sections have suitable bearings to permit the necessary turning of the press-box assembly. The outboard vertical members of the press are customarily of structural rods or

structural-steel shapes. On half the press frame is mounted the condenser and packing apparatus, which serve as the means for depositing the freshly ginned lint in one receiving box of the press while the cotton in the other box is being pressed into a bale.

Trampers, Kickers, and Dogs

Preliminary packing of the cotton is customarily performed by a tramper, which at each stroke pushes the freshly ginned cotton downward into the cotton box. The lint cotton is thrown into the receiving box by the kicker while the tramper is at the upper position of its stroke. Dogs in the sides of the boxes retain the lint in a semidense condition between strokes of the tramper.

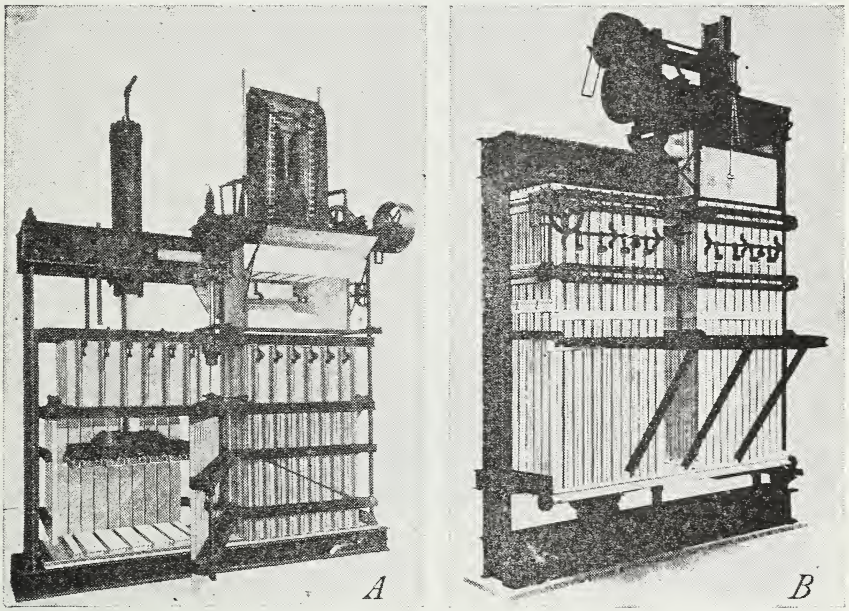

Figure 6.—Modern all-steel low-density cotton-gin presses: Left, downpressing; right, uppressing.

The press dogs vary with each make and model of gin press in number, from 4 to 6 per side; and also in size, shape, and position. It has been an established practice, however, for uppressing press dogs to be placed an average of 19 or more inches below the top of the box, as compared with only 9 inches for downpressing presses.

Press Cylinders and Rams

Representative rams for low-density gin presses have varied slightly in size, the prevalent size being 8⅜ inches in diameter by from 7 feet 11 inches to 8 feet 10 inches long, with cast-iron or steel-pipe casings suitable, respectively, for pressures of about 1,500 and 2,500 p. s. i., which will place a maximum pressure of about 69 tons on the cotton bale. Frequently the rams are turned down to 8¼ inches in diameter to compensate for wear.

Water is the predominant hydraulic fluid, although nonexplosive petroleum has been recommended for preservation of the polished plungers, improved performance of the ram-packing, and as a safety factor to prevent freezing in cold weather.

Press Pumps

Various kinds of hydraulic pumps have been used in American cotton gins (fig. 7). Some are driven by steam and others by individual power units or from shafting. The representative steam

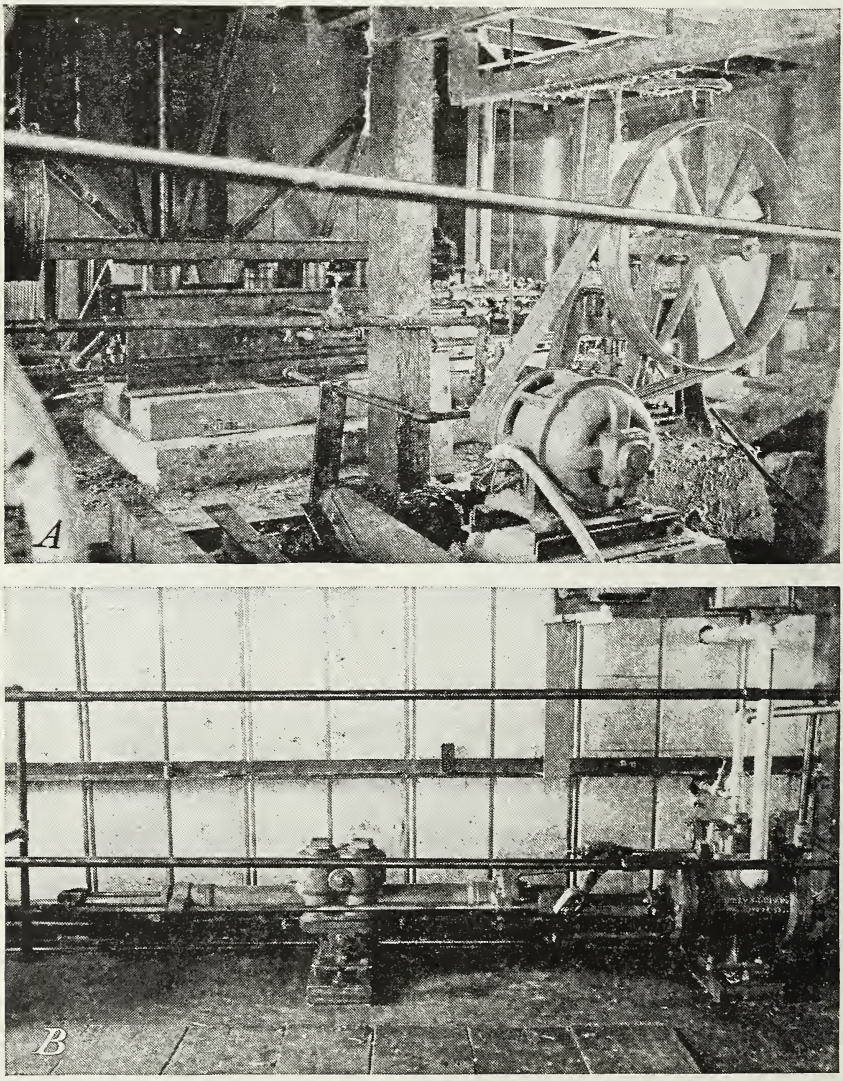

Figure 7.—Cotton-gin press pumps: *A*, Typical vertical triplex pump, motor-driven; *B*, Horizontal pump, steam-driven.

pumps are horizontal 8½ by 1½ inches by a 10- or 12-inch stroke[3] suitable for steam working pressures of approximately 85 to 100 p. s. i., with pumping capacities ranging from 9 to 15 gallons per minute up to 3,200 pounds hydraulic pressure per square inch. The 1940 census report showed that 28 percent of the cotton gins of the United States employed steam power, and many of these used horizontal steam-press pumps.

Among the kinds of hydraulic pumps that are mechanically operated, the multicylinder pumps of the triplex form predominate (fig. 7), although quadruple and sextuple pumps are frequently found. These are usually designed for hydraulic pressures of 1,800 to 2,500 p. s. i. and have plungers approximately 1½ inches in diameter with a 4-inch stroke.

The mechanically driven pumps are to be found in both horizontal and vertical types, some heavily back-geared, others fitted with pulleys of large diameter for belted drives. These can be operated intermittently or continuously, depending on the system of piping used. Where a pump is fitted with tight and loose pulleys, it is started and stopped for each bale, but where it runs continuously, a circulating bypass with low frictional resistance is usually provided, so that the operation of pressing and release valves is controlled by means of rods extending to the press platform.

Limitations of Press Conversions

To convert an existing low-density press to standard density, the press boxes are narrowed to 20 inches by complete reconstruction or by installing wooden or metallic liners 3½ inches thick on the sides only of the old boxes (fig. 8). The end doors of the boxes are

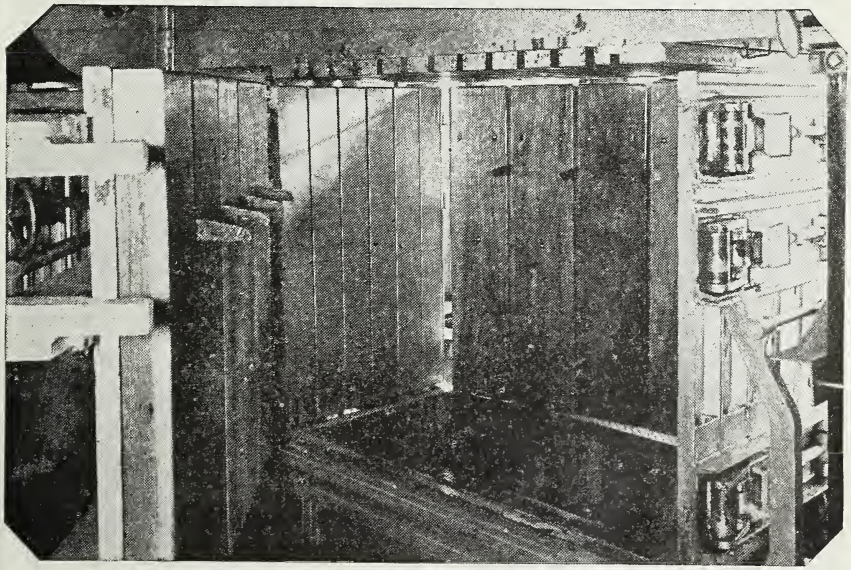

Figure 8.—Experimental gin press at Cotton Ginning Laboratory, showing one side of boxes reduced in width by 3½-inch-thick waxed-oak liners. No liners are used on ends of box.

[3] Steam-cylinder diameter × hydraulic plunger diameter × stroke, in inches.

not lined. The liners in the cotton boxes below the press doors should be surfaced and finished smooth and straight, but each side of the liners in the press box itself may be tapered outward at the top approximately ½ inch in total length, to facilitate pressing, releasing of bale, and lessening of side pressures.

Where liners are used, arrangements should be made for longer dogs or retaining mechanism to afford adequate protrusion of the dog through the liners for holding the cotton during the packing operation. The door construction should be appreciably strengthened to meet the additional pressing loads imposed. Side doors require sturdy longitudinal bracing, preferably with structural beams or channels 6 to 8 inches deep, and the doors should preferably have a worm-and-wheel locking mechanism that is safe and easy to operate. The doors must be side swinging for safety, and the hinges should be not smaller than 1½-inch-diameter cold-rolled steel. The entire door assembly should be built about the center column by means of a long sleeve and good framing for the door hinges.

With the narrowed box, the cotton has a tendency to be thrown by the kicker to the center of the box, and therefore rolling bales are not in evidence, as is frequently the case with the wide boxes of low-density presses. The usual adjustments to the condenser, however, are required in preserving uniform delivery of the cotton across the entire length of the box to avoid big-ended bales.

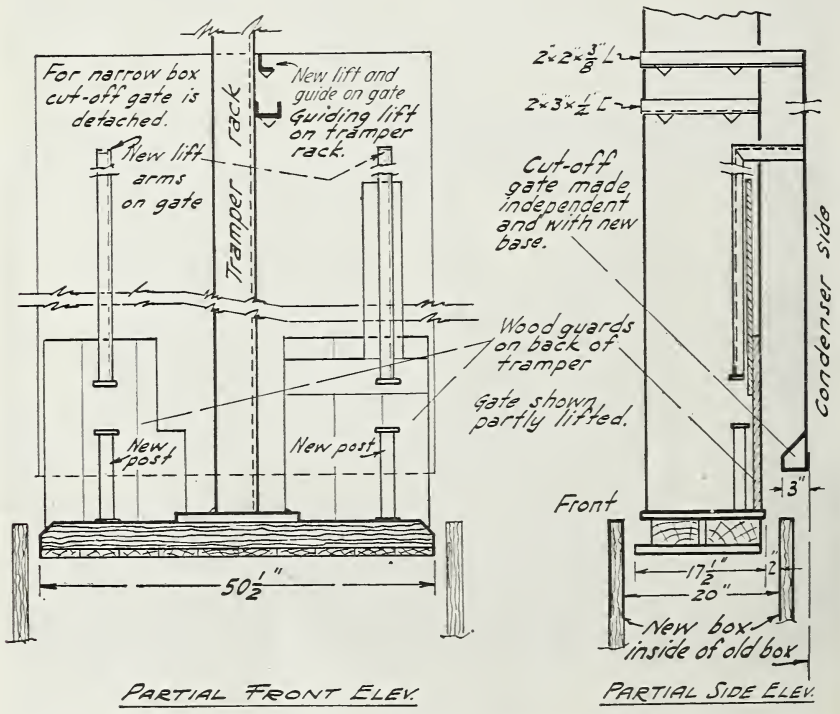

FIGURE 9.—Changes in tramper foot and lint cut-off gate of farm press to suit narrowed press box for conversion to 20- by 54-inch standard-density gin bales.

Extension of the lower end of the lint slide may be necessary to function with the cut-off gate.

Most of the present designs of trampers are suitable for use with standard-density presses if their supporting sills are strengthened to withstand the added loads. (See fig. 2.) Changes made in tramper foot and lint cut-off gate for narrow press box are shown in figure 9. Such changes should be resorted to only if factory-built items cannot

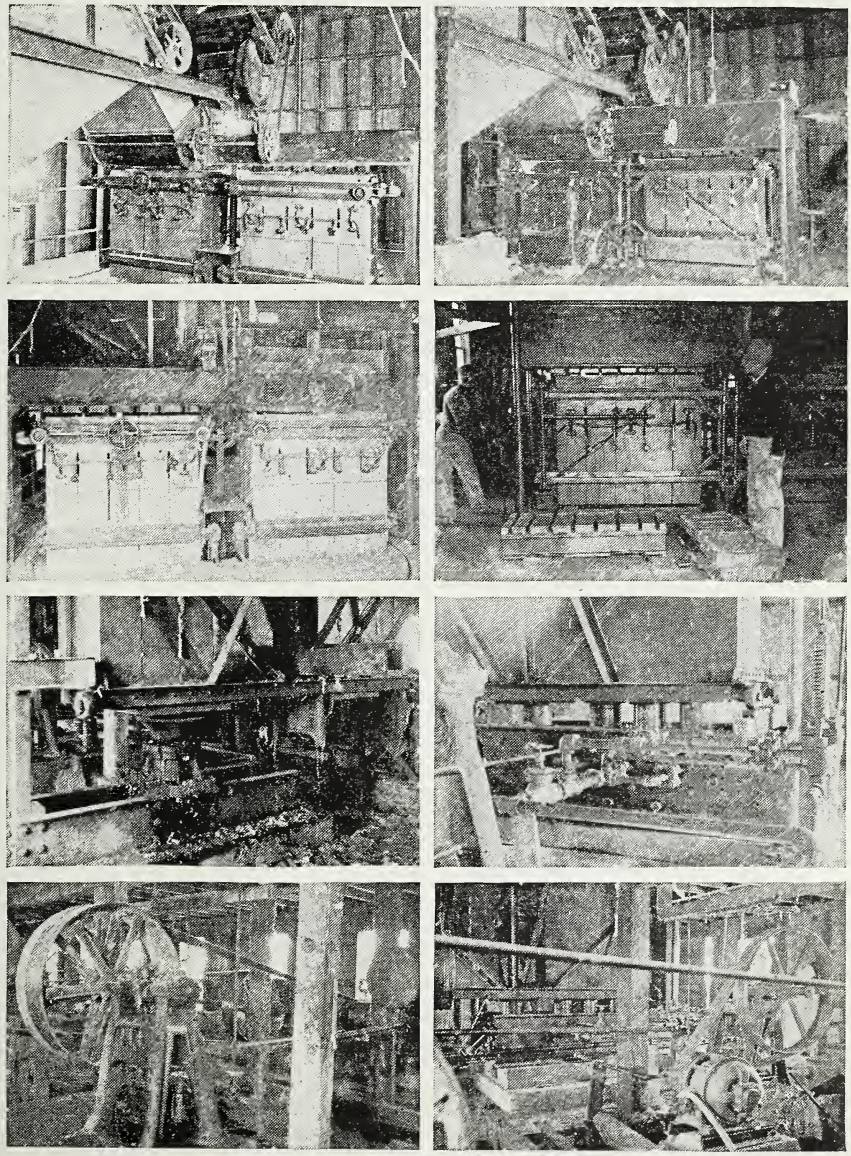

FIGURE 10.—Views of farm gin press before (*left*) and after (*right*) conversion to standard density for commercial and experimental tests.

be obtained, because they are frequently very troublesome in operation.

To obtain the densities required with such converted presses, the low-density press ram, usually 8⅜ inches in diameter and lengthened to provide for a 90-inch stroke, may be used along with two additional rams, making a triple ram set-up to operate as previously described for new standard-density presses. Care must be taken to inspect the casings, packing glands, and general serviceability of any used rams contemplated for further use; however, 9½-inch rams are basic to the most satisfactory standard-density pressing of cotton of subnormal moisture content. Selection of undersized or faulty rams will place serious limitations on any conversion.

Platen separation of approximately 20 to 22 inches has proved to be the average and desirable working distance between ram follower block and upper platen at the end of the pressing stroke. Since the cotton is not "killed" as is done in commercial compressing, this separation is also necessary in order to tie out the bales, so that their expansion will permit final dimensions to retain the standard density.

Two partial field conversions of low-density presses to standard density have been made by the United States Cotton Ginning Laboratory and were found to be mechanically and economically feasible (fig. 10).

Railroad-rail braces were employed to reinforce the press doors, home-made heavy cam locks were used for latching the doors into pressing position, and rope snubbers were used when releasing the pressure on the doors before tying out the bales. Factory construction, of course, should eliminate such experimental necessities.

For sale by the Superintendent of Documents, U. S. Government Printing Office
Washington 25, D. C. - Price 5 cents

☆ U. S. GOVERNMENT PRINTING OFFICE: 1945—645789